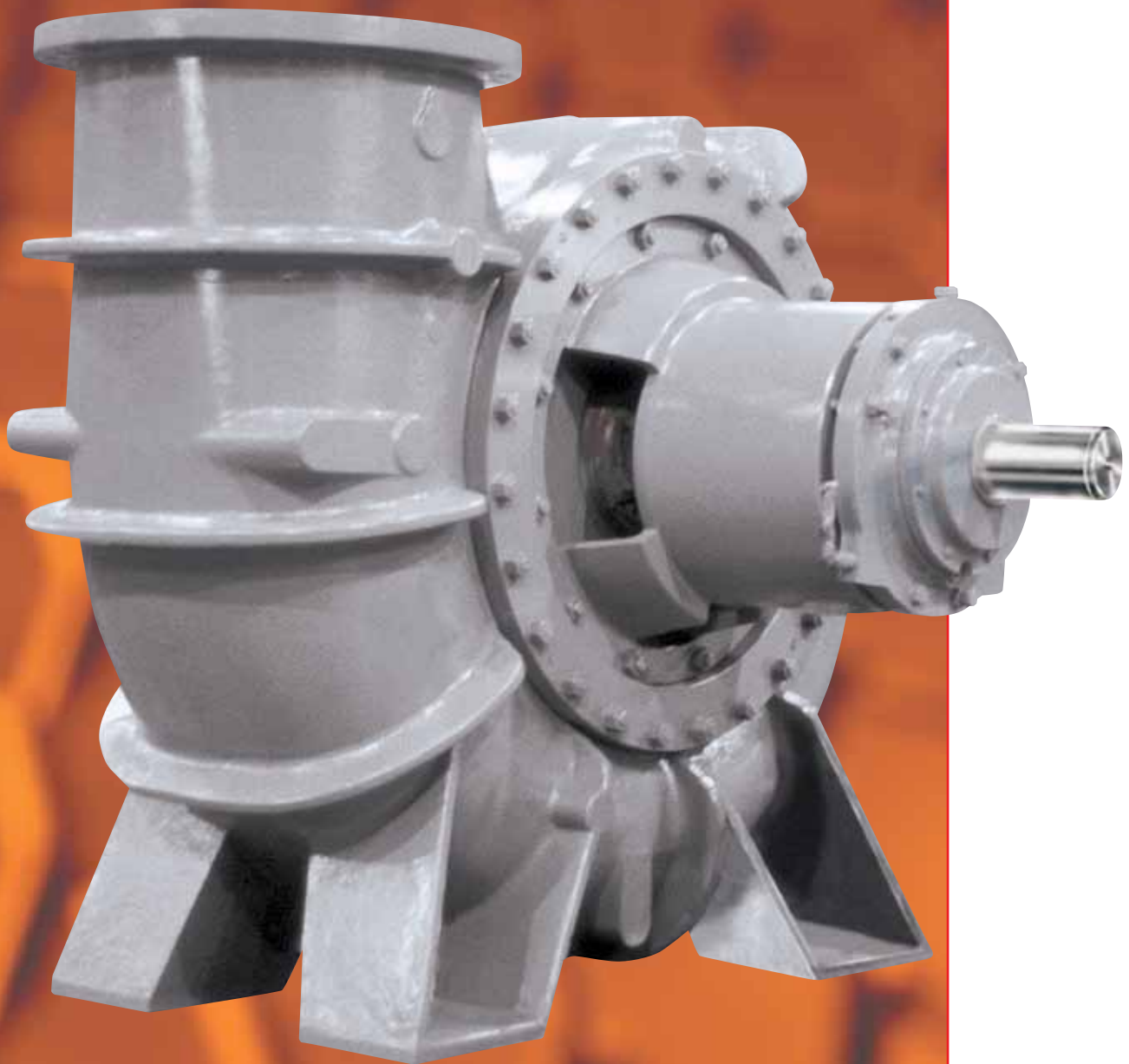




Pump Division

***MNR  
MND***

***Absorber  
Recirculation  
Pumps***



## **Pump Supplier To The World**

*Flowserve is the driving force in the global industrial pump marketplace. No other pump company in the world has the depth or breadth of expertise in the successful application of pre-engineered, engineered and special purpose pumps and systems.*

### **Pumping Solutions**

Flowserve is providing pumping solutions which permit customers to continuously improve productivity, profitability and pumping system reliability.

### **Market Focused Customer Support**

Product and industry specialists develop effective proposals and solutions directed toward market and customer preferences. They offer technical advice and assistance throughout each stage of the product life cycle, beginning with the inquiry.



### **Dynamic Technologies**

Flowserve is without peer in the development and application of pump technology, including:

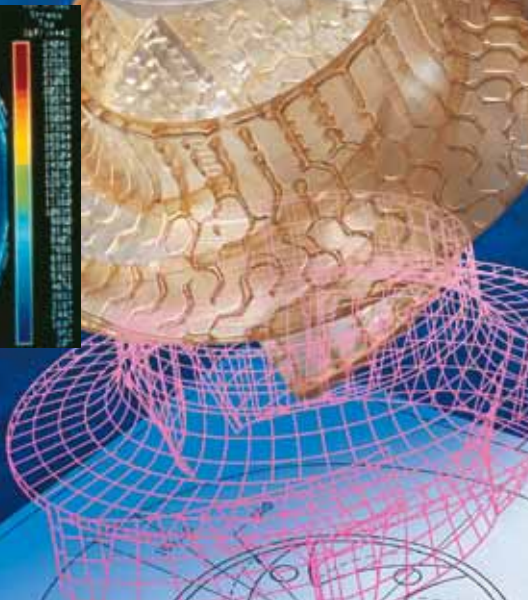
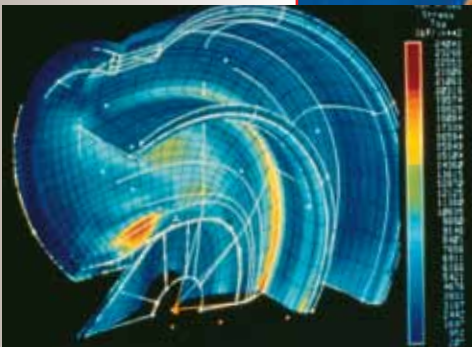
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

### **Broad Product Lines**

Flowserve offers a wide range of complementary pump types, from pre-engineered process pumps, to highly engineered and special purpose pumps and systems. Pumps are built to recognized global standards and customer specifications.

Pump designs include:

- Single stage process
- Between bearing single stage
- Between bearing multistage
- Vertical
- Submersible motor
- Rotary
- Reciprocating
- Nuclear
- Specialty



**MNR, MND  
Absorber  
Recirculation  
Pumps**

**The Most Efficient and  
Reliable In The Industry**

A leading pump supplier to the electric utility industry throughout the world, Flowserve is committed to making flue gas desulfurization (FGD) systems operate more efficiently and effectively, resulting in substantial operating savings.

The rugged and reliable MNR and MND absorber recirculation pumps are renown for their highly efficient performance, versatile mounting and drive configurations and variety of material options.

**Performance Benefits**

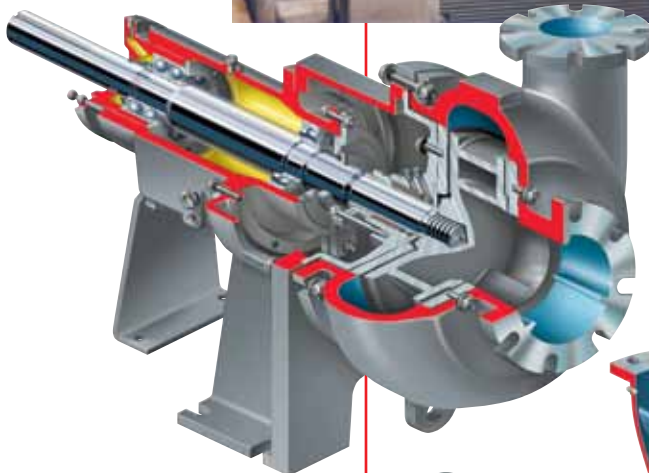
- Flexibility
  - Configurations
  - Motor mounts
  - Nozzle orientation
- Reliability
  - Robust construction
  - Special materials
- Efficiency
  - Broad hydraulic range
  - Reduced power consumption
- Easy maintenance

**Applications**

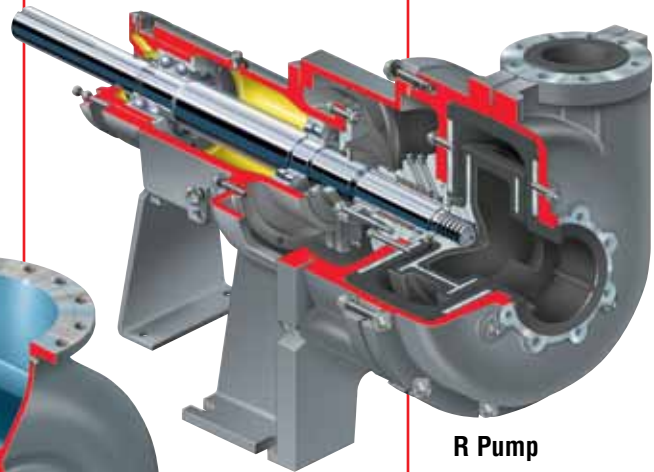
- FGD absorber tower
- Evaporators
- Crystallizers

**Complementary  
Pump Designs**

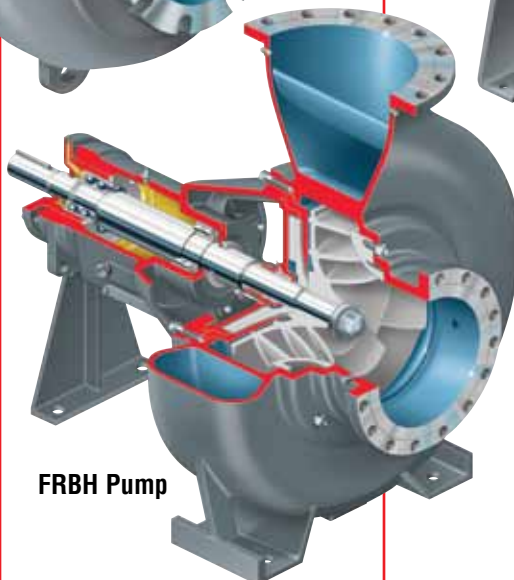
- M Hard Metal Slurry Pump
- R Rubber Lined Slurry Pump
- FRBH Heavy-Duty Process Pump



**M Pump**



**R Pump**



**FRBH Pump**

**MNR, MND  
Absorber  
Recirculation  
Pumps**

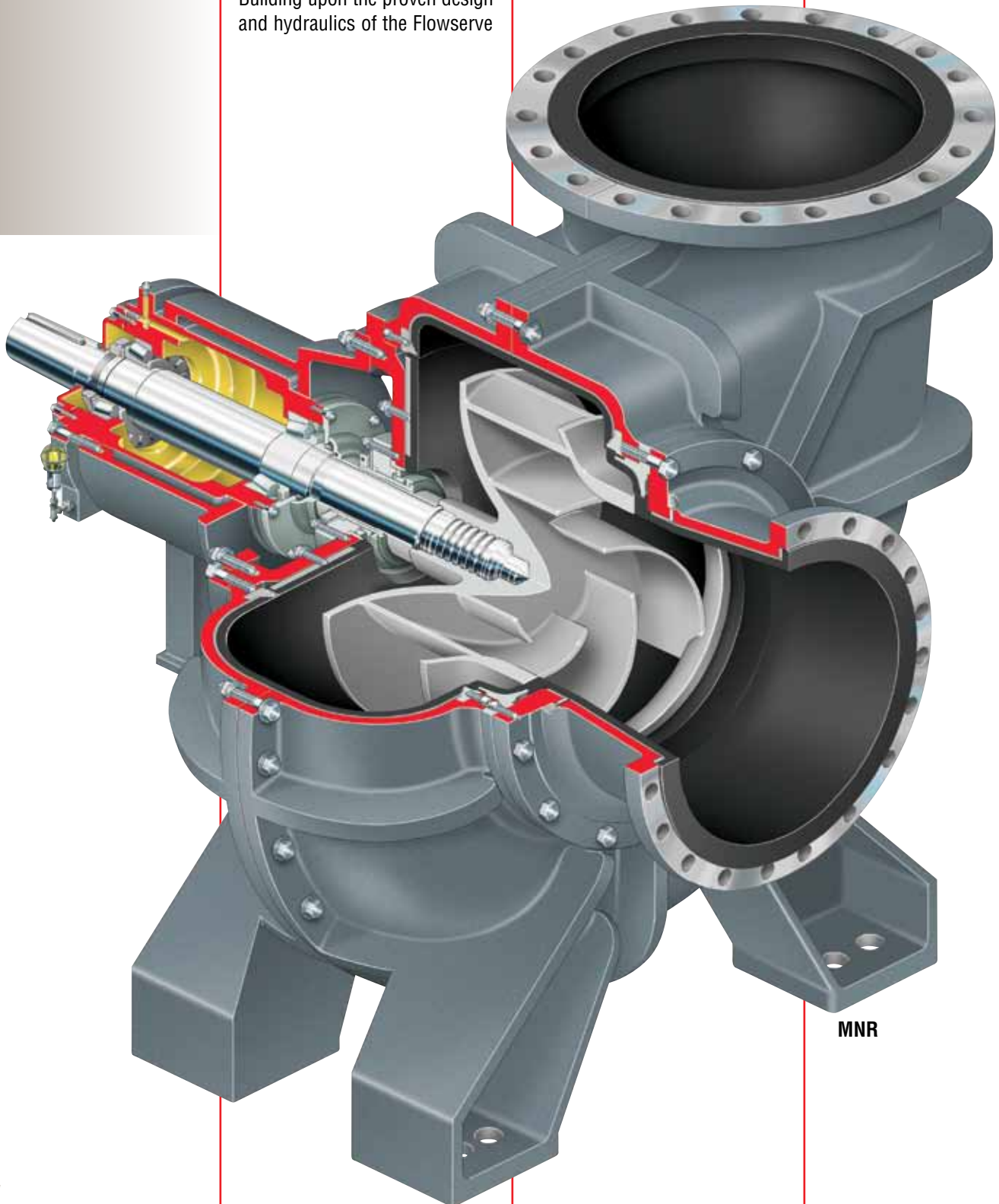
The Flowserve MNR and MND absorber recirculation pumps reflect the company's industry-leading experience in pump design and materials engineering.

Building upon the proven design and hydraulics of the Flowserve

MN solids-handling pump, the rubber lined MNR and metallic MND absorber recirculation pumps are enhanced with additional abrasion and corrosion resistance features required for slurry recirculation systems.

**Operating Parameters**

- Flows to 17 500 m<sup>3</sup>/h (77 000 gpm)
- Heads to 40 m (130 ft)
- Sizes 600 mm (24 in) to 1000 mm (40 in)



**MNR**

**Radially Split Casing** provides access to the impeller. Rugged feet securely support the casing and permit pump maintenance without disturbing pipe connections. Tangential discharge provides unobstructed flow path and extends wear life

**Replaceable Casing Wear Ring** extends casing life and is available in many corrosion and abrasion resistance materials

**Flanges** are compatible with ASME (ANSI) Class 125 flat faced, or can be drilled to suit DIN PN-16 rating. Liners extend beyond casing to form a gasket seal

**Front and Back Pullout** design of lined and unlined casings facilitates maintenance and offers flexibility

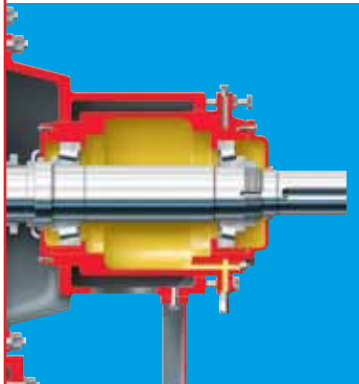
**High Efficiency Impeller** is one piece design with no exposed threads. Mixed flow vane design is highly efficient at hydraulic conditions found in recirculation services. Multiple material choices permit maximum wear life in corrosive and erosive environments

**Opposed Tapered Roller Bearings** firmly support the shaft, virtually eliminate axial and radial thrust loads and are designed for a minimum B10 life of 100 000 hours

**Shaft Sleeve Release Collar** facilitates impeller removal, minimizing maintenance expense



**External End Clearance Adjustment** maintains performance and reduces recirculation without the use of shims



**Product Flush Slurry Seal** is located directly behind impeller in tapered housing for optimum recirculation. For the MNR, the acid resistant seal adapter is available in many materials to suit application

- Duplex and super austenitic stainless steels
- Hastelloy® C
- Zirconium



**Removable One Piece Elastomeric Liner** is secured in place externally with screws, locking into metal backing. Protects against wear and:

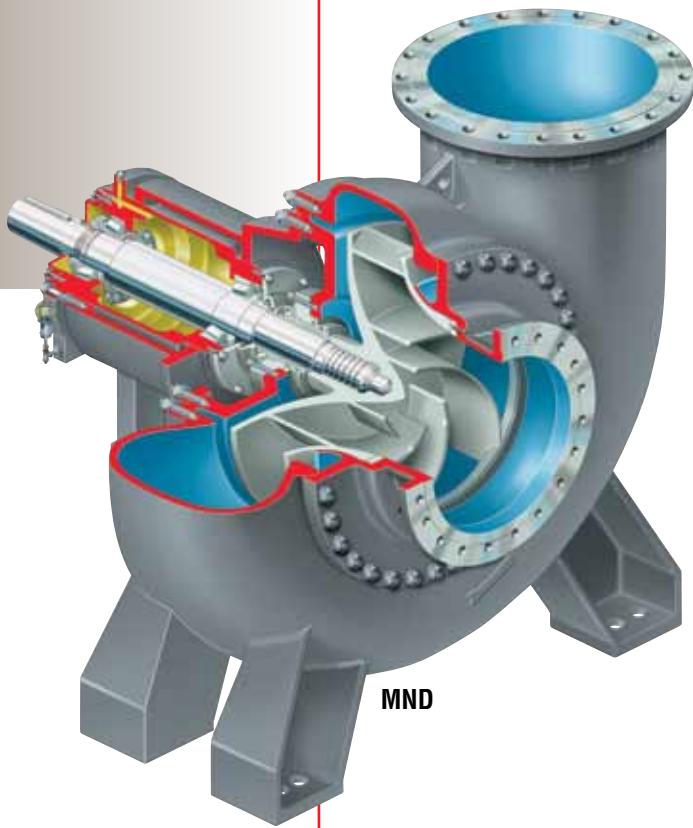
- Eliminates the vertical centerline liner joint
- Simplifies fitting and sealing the liner in the discharge flange
- Allows both back and front pullout for maintenance



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### Options and Technical Data

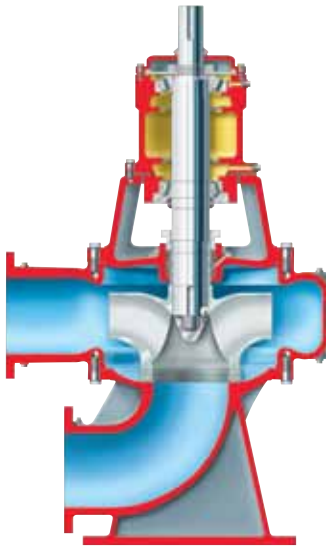
The all metal MND shares many performance enhancing features with the MNR, including front and back pull-out design, externally secured casing wear ring, and one-piece high efficiency impeller.



MND

### Materials of Construction

Component	MNR	MND
Casing, Rear Cover, Suction Head	Cast Iron	Super Chrome Iron or Duplex Stainless Steel
Casing Liner, Rear Cover Liner, Suction Head Liner	Rubber, Neoprene or Hypalon®	N/A
Impeller	Super Chrome Iron or Duplex Stainless Steel	
Shaft Sleeve	Duplex Stainless Steel or Hastelloy C	
Mechanical Seal Adapter	Duplex Stainless Steel or Hastelloy C	N/A
Casing Wear Ring	Duplex Stainless Steel or Super Chrome	



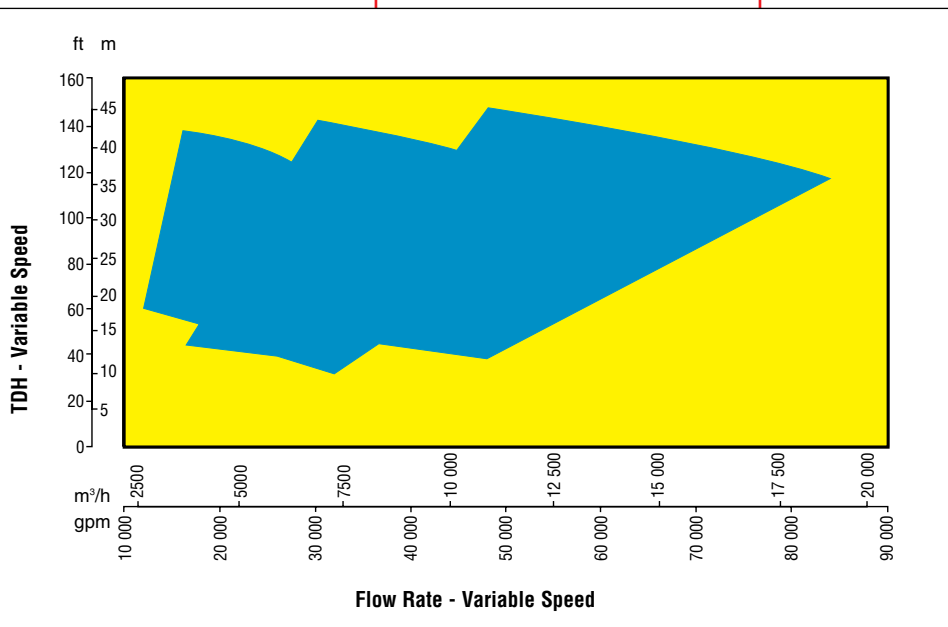
### Optional Vertical Configurations

The MNR and MND may be vertically mounted as well. Benefits include:

- Reduced shaft deflection
- Smaller footprint
- Reduced radial loads
- Easy retrofits

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MNR and MND Range Chart



**Global Engineered Services and Support**

- Total Cost Reduction*
- Asset Management*
- Product Life Cycle*
- Performance Re-rates*
- Site Diagnostics*
- Repair Services*
- Energy Management*
- Spare Parts*
- Maintenance Contracts*
- Materials Upgrades*
- Turnkey Services*
- Field Repairs*
- Installation*
- Project Supervision*
- Commissioning*
- Equipment Upgrades*
- Condition Monitoring*
- Systems Analysis*
- Field Machining*

**Service Dedication**

Flowserve Engineered Services is focused on providing customers with uncompromising service and support, where and when needed. Engineered Services is dedicated to delivering the highest quality support by integrating its extensive pump and materials engineering knowledge with creative service solutions. Engineered Services prides itself in understanding the business challenges facing customers and is prepared to manage solutions to succeed as a team.

A worldwide network of service and repair centers staffed by highly skilled engineers and technicians is available around the clock, seven days a week to respond to customer queries, to evaluate and troubleshoot problems and to provide reliable solutions.



**Strength of Experience, Commitment to Excellence**

Flowserve has long served industries requiring superior equipment performance and service life.

- Oil and gas production
- Hydrocarbon processing
- Chemical processing
- Water resources
- Power generation
- Nuclear
- Mining and mineral processing
- Pulp and paper
- General industry

Engineered Services is dedicated to maximizing equipment performance and providing reliability-centered maintenance programs for pumps and related equipment, regardless of manufacturer. Using the FlowStar™ asset management software, Engineered Services tracks performance and supports improvement programs using a service life cycle cost business approach. The results are improved reliability and increased profitability.

Your Business Partner Flowserve partners with customers to respond to the dynamic business conditions that affect them. Flowserve will work with customers to drive efficiency, maximize throughput and control process quality. Whether your needs involve on-site technical assistance or broader project planning with full turnkey responsibility, you can rely on the strength of Flowserve Engineered Services to deliver professional, reliable results.



**Flowserve... Supporting Our Customers  
With The World's Leading  
Pump Brands**



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**Pump Division**

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